In the Claims:

1. (Canceled).

2. (Previously Presented) In a multi-carrier data communication system, a method of estimating a carrier frequency offset for a received signal, the method comprising:

associating each of a plurality of carrier-specific weighting factors with a different one of a plurality of carriers of the multi-carrier data;

assigning a value to each of the plurality of carrier-specific weighting factors, wherein the step of assigning the value to each of the plurality of carrier-specific weighting factors comprises:

measuring a noise power spectrum across the plurality of carriers;

selecting a value inversely proportional to the noise power for one of the plurality of carriers; and

assigning the selected value to the associated carrier-specific weighting factor; and

computing a carrier frequency offset estimate using the received signal, an estimate of a channel transfer function associated with the received signal, and the plurality of carrier-specific weighting factors.

3. (Original) The method of claim 2, wherein:

the plurality of carriers includes a first subset of pilot carriers and a second subset of non-pilot carriers; and

the step of assigning a value to each of the plurality of carrier-specific weighting factors comprises increasing a first carrier-specific weighting factor associated with one of the pilot carriers relative to a second carrier-specific weighting factor associated with one of the non-pilot carriers.

4. (Currently Amended) In a multi-carrier data communication system, a method of estimating a carrier frequency offset for a received signal, the method comprising:

associating each of a plurality of carrier-specific weighting factors with a different one of a plurality of carriers of the multi-carrier data;

assigning a value to each of the plurality of carrier-specific weighting factors, the value being inversely related to a noise power associated with the associated carrier; and

computing a carrier frequency offset estimate, wherein the step of computing the carrier frequency offset estimate comprises:

phase-compensating the received signal using a previous carrier frequency offset estimate;

equalizing the phase-compensated signal using an estimate of the channel transfer function;

computing a phase metric from the phase-compensated signal, the equalized signal, the estimate of the channel transfer function, and the plurality of carrier-specific weighting factors;

computing a phase of the phase metric; and

applying a loop filter to the computed phase.

5. (Original) The method of claim 4, wherein the step of computing the phase metric comprises:

applying a threshold cutoff to the equalized signal, thereby producing a sliced signal;

multiplying the phase-compensated signal for each of the plurality of carriers by the complex conjugate of the sliced signal for the carrier and by the complex conjugate of the channel estimate for the carrier, thereby obtaining a first product;

multiplying the first product by the carrier-specific weight associated with the carrier, thereby obtaining a weighted product; and

summing the weighted product over the plurality of carriers, thereby obtaining the phase metric.

6. (Previously Presented) The method of claim 2, further comprising: using the carrier frequency offset estimate to phase-compensate a subsequent received signal.

7. (Currently Amended) A method for processing a multi-carrier signal transmitted across a channel, comprising:

assigning a value to each of a plurality of carrier-specific weighting factors, each of the plurality of carrier-specific weighting factors being associated with a different one of a plurality

of carriers of the multi-carrier signal, the assigned value of each carrier-specific weighting factor being inversely related to a noise power associated with the carrier;

receiving the multi-carrier signal;

phase compensating the multi-carrier signal using a phase compensation factor;

equalizing the phase-compensated signal using a channel estimate;

estimating a carrier frequency offset using the phase-compensated signal, the equalized signal, the channel estimate, and the plurality of carrier-specific weighting factors;

estimating a clock frequency offset using the estimated carrier frequency offset; and

updating the phase compensation factor using the estimated carrier frequency offset and the estimated clock frequency offset.

8. (Original) The method of claim 7, wherein the step of assigning a value to each of the plurality of carrier-specific weighting factors comprises:

measuring a noise power spectrum across the plurality of carriers;

selecting a value inversely proportional to the noise power for one of the plurality of carriers; and

assigning the selected value to the associated carrier-specific weighting factor.

9. (Original) The method of claim 7, wherein:

the plurality of carriers includes a first subset of pilot carriers and a second subset of non-pilot carriers; and

the step of establishing a plurality of carrier-specific weighting factors comprises increasing a first carrier-specific weighting factor associated with one of the pilot carriers relative to a second carrier-specific weighting factor associated with one of the non-pilot carriers.

10. (Previously Presented) The method of claim 7, wherein:

the plurality of carriers includes a first carrier and a second carrier, a first channel estimate associated with the first carrier having a higher reliability than a second channel estimate associated with the second carrier; and

the step of establishing a plurality of carrier-specific weighting factors comprises increasing a first carrier-specific weighting factor associated with the first carrier relative to a

second carrier-specific weighting factor associated with the second carrier.

11. (Original) The method of claim 7, wherein the step of estimating the carrier frequency offset comprises:

computing a phase metric from the phase-compensated signal, the equalized signal, the channel estimate, and the plurality of carrier-specific weighting factors;

computing a phase of the phase metric; and

applying a loop filter to the computed phase.

12. (Original) The method of claim 11, wherein the step of computing the phase metric comprises:

applying a threshold cutoff to the equalized signal, thereby producing a sliced signal;

multiplying the phase-compensated signal for each of the plurality of carriers by the complex conjugate of the sliced signal for the carrier and by the complex conjugate of the channel estimate for the carrier, thereby obtaining a first product;

multiplying the first product by the carrier-specific weight associated with the carrier, thereby obtaining a weighted product; and

summing the weighted product over the plurality of carriers, thereby obtaining the phase metric.

13. (Original) The method of claim 12, wherein the loop filter comprises an infinite impulse response filter.

14. (Original) The method of claim 7, wherein the step of estimating a clock frequency offset comprises multiplying the estimated carrier frequency offset by a factor inversely proportional to a carrier frequency.

15. (Previously Presented) The method of claim 14, further comprising:

computing a net time offset based on the clock frequency offset estimate and an elapsed time;

generating a drop instruction when the net time offset exceeds a drop threshold, the drop instruction causing a portion of the multi-carrier signal to be dropped from a symbol;

generating an add instruction when the net time offset is below an add threshold, the add instruction causing a portion of the multi-carrier signal to be added to the symbol; and

resetting the elapsed time after the portion of the multi-carrier signal has been added to or dropped from the symbol.

16. (Original) The method of claim 7, further comprising:

determining a coarse carrier frequency offset;

determining a fine carrier frequency offset; and

updating the phase compensation factor using the coarse carrier frequency offset and the fine carrier frequency offset.

17. (Currently Amended) In a multi-carrier data communication system, a method of equalizing a multi-carrier signal, the method comprising:

estimating a channel transfer function;

compensating a received signal using a phase compensation factor, yielding a phase-compensated signal;

compensating the phase-compensated signal using the estimated channel transfer function, yielding an equalized signal;

estimating a phase metric using the phase-compensated signal, the equalized signal, the estimated channel transfer function, and a plurality of carrier-specific weighting factors, wherein each of the carrier-specific weighting factors being associated with a different one of a plurality of carriers of the multi-carrier signal and assigned a value inversely related to a noise power associated with the carrier;

estimating a carrier frequency offset using the estimated phase metric;

estimating a clock frequency offset using the updated estimate of the carrier frequency offset; and

updating the phase compensation factor using the estimated carrier frequency offset and the estimated clock frequency offset.

18. (Original) The method of claim 17, wherein the value of each of the carrier-specific weighting factors is inversely proportional to a noise power associated with the associated carrier.

19. (Original) The method of claim 18, wherein:

the plurality of carriers comprises a first subset of pilot carriers and a second subset of non-pilot carriers; and

the carrier-specific weighting factor associated with at least one of the pilot carriers is increased relative to the carrier-specific weighting factor associated with at least one of the non-pilot carriers.

20. (Original) The method of claim 18, wherein:

the plurality of carriers includes a first carrier and a second carrier, a first channel estimate associated with the first carrier having a higher reliability than a second channel estimate associated with the second carrier; and

the carrier-specific weighting factor associated with the first carrier is increased relative to the carrier-specific weighting factor associated with the second carrier.

21. (Previously Presented) The method of claim 17, wherein the step of estimating the phase metric comprises:

applying a threshold cutoff to the equalized signal, thereby producing a sliced signal;

multiplying the phase-compensated signal for each carrier by a complex conjugate of the sliced signal for the carrier and by a complex conjugate of the estimated channel transfer function for the carrier, thereby obtaining a product;

multiplying the product by the carrier-specific weight associated with the carrier, thereby obtaining a weighted product; and

summing the weighted product over the plurality of carriers, thereby obtaining the phase metric.

22. (Previously Presented) The method of claim 17, wherein the step of estimating the clock frequency offset comprises multiplying the estimated carrier frequency offset by a factor

inversely proportional to the carrier frequency.

23. (Previously Presented) The method of claim 22, further comprising:

computing a net time offset based on the clock frequency offset estimate and an elapsed time;

generating a drop instruction when the net time offset exceeds a drop threshold, the drop instruction causing a portion of the multi-carrier signal to be dropped from a symbol;

generating an add instruction when the net time offset is below an add threshold, the add instruction causing a portion of the multi-carrier signal to be added to the symbol; and

resetting the elapsed time after the portion of the multi-carrier signal has been added to or dropped from the symbol.

24. (Previously Presented) The method of claim 17, wherein the step of estimating the carrier frequency offset comprises:

computing the phase metric from the phase-compensated signal, the equalized signal, the estimated channel transfer function, and the plurality of carrier-specific weighting factors;

computing a phase of the phase metric; and

applying a loop filter to the computed phase.

25. (Currently Amended) In a receiver for a multi-carrier data communication system, an equalizer comprising:

a phase compensator configured to receive an input signal, a carrier frequency phase offset estimate, and a clock frequency phase offset estimate, and to output a phase-compensated signal;

a channel equalization block configured to receive a plurality of channel estimates and the phase-compensated signal, and to output an equalized data signal;

a carrier frequency offset estimator configured to receive the plurality of channel estimates, the phase-compensated signal, and the equalized data signal, and to compute and output the carrier frequency phase offset estimate using a plurality of carrier-specific weighting factors, wherein each of the carrier-specific weighting factors being associated with a different

one of a plurality of carriers of the multi-carrier data and having a value inversely related to a noise power associated with the associated carrier; and

a clock frequency offset estimator configured to receive the carrier frequency phase offset estimate and compute the clock frequency phase offset estimate.

26. (Previously Presented) The equalizer of claim 25, wherein the carrier frequency offset estimator comprises:

a weight source configured to output the plurality of carrier-specific weighting factors; a slicer configured to receive the equalized data signal and to output a sliced signal;

a phase metric updater configured to receive the plurality of channel estimates, the phase-compensated signal, the sliced signal, and the plurality of carrier-specific weighting factors, and to compute and output a phase metric;

a phase computation unit coupled to the phase metric updater and configured to compute and output a phase of the phase metric; and

a loop filter coupled to the phase computation unit and configured to store a plurality of values of the phase and to compute the carrier frequency phase offset estimate.

27. (Original) The equalizer of claim 26, wherein the weight source comprises a noise estimator configured to measure a noise power spectrum.

28. (Previously Presented) A multi-carrier data communication system comprising:

a transmitter including:

a modulator/deserializer configured to convert an input data stream into a parallel plurality of multi-carrier signals;

a frequency-domain to time-domain converter having an input coupled to the modulator/deserializer and configured to transform the parallel plurality of multi-carrier signals from frequency domain into time domain at an output;

a guard period insertion block coupled to the frequency-domain to time-domain converter and configured to insert a guard period in the output of the frequency-domain to time-domain converter;

a serializer coupled to an output of the guard period insertion block and configured to perform a parallel to serial conversion on the signal; and

a digital-to-analog converter coupled to the serializer and configured to convert a digital signal into an analog signal and to transmit the analog multi-carrier time domain signal across a channel; and

a receiver including:

an analog-to-digital converter coupled to receive the analog signal and configured to convert the analog signal into a second digital signal;

a deserializer coupled to the analog-to-digital converter and configured to convert the second digital signal into a second parallel plurality of multi-carrier signals;

a channel estimator coupled to an output of the deserializer and configured to compute a plurality of channel estimates;

a guard period removal block coupled to an output of the channel estimator and configured to remove the guard period;

a time-domain to frequency-domain converter coupled to an output of the guard period removal block;

an equalizer coupled to an output of the time-domain to frequency-domain converter, configured to equalize the second parallel plurality of multi-carrier signals using the plurality of channel estimates and further configured to compensate for a carrier frequency offset and a clock frequency offset using a carrier frequency offset estimate that includes a plurality of carrier-specific weighting factors, wherein each of the carrier-specific weighting factors is associated with a different one of a plurality of carriers of the second parallel plurality of multi-carrier signals and having a value related to a noise power associated with the associated carrier; and

a serializer/demodulator coupled to the output of the equalizer and configured to generate an output data stream.

29. (Previously Presented) The multi-carrier data communication system of claim 28, further comprising:

a preliminary carrier frequency offset estimation block coupled between the deserializer and the guard period removal block, wherein the preliminary carrier frequency offset estimation block is configured to output a preliminary estimate of carrier frequency offset.

30. (Original) The multi-carrier data communication system of claim 29, wherein the equalizer is configured to receive the preliminary estimate of carrier frequency offset for use in compensating for the carrier frequency offset.